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## Case Report

# Predicting malignancy in dermoid cyst: A case report and literature review

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### ABSTRACT

Benign mature cystic teratoma has been seen through all ages of a woman's age. It has varied presentations. Malignant transformation in teratoma though rare is usually seen in postmenopausal women. Malignant transformation is usually detected postoperatively on histopathology. We are reporting a case in which a postmenopausal lady was operated and squamous cell carcinoma in a dermoid cyst was detected postoperatively. Certain signs on the imaging can help to diagnose this in the preoperative period so that proper counselling and treatment can be given to the patient.

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## 1. Introduction

Benign mature cystic teratomas (MCT) of ovary are usually termed dermoid cyst as they have abundance of skin elements.<sup>1</sup> It consists of well differentiated derivatives of the three germ layers. Approximately 2% of the cases show malignant transformation which is a rare incidence.<sup>2</sup> Of all the malignant transformations, 75- 85% are squamous cell carcinomas.<sup>3</sup> Other transformations are adenocarcinoma (7%), sarcomas(7%), melanomas (<1%), basal cell carcinomas (<1%), anaplastic carcinoma(<1%).<sup>4</sup>

Preoperative diagnosis of malignancy is difficult due to the rarity of malignant transformation in a dermoid cyst(MCT) and its similarity to the benign MCT.<sup>5</sup> Postoperative histopathological examination makes the final diagnosis of malignancy.

The case is being reported for some retrospective insight of features that could help suspect malignant transformation.

## 2. Case Report

A 57years old unmarried postmenopausal woman reported with vague lower abdominal pain. She carried with herself an ultrasound showing a left adnexal complex cyst (10 cm X 6cm with a 2.8cm solid nodule) with no free fluid, suggestive of dermoid cyst. CA125 was 32 IU units and CEA was 2.3 units. There was no history of loss of weight, appetite, or abdominal distension. There was no family history of ovarian or breast carcinoma.

Clinically vitals were normal with no supraclavicular or inguinal lymphadenopathy. On abdominal examination no ascites or mass was detected. Being unmarried, patient refused per speculum and bimanual examinations.

Preoperative workup was within normal limits. While awaiting MRI, patient required intervention as a semi-emergency condition for acute abdominal pain and suspected ovarian torsion.

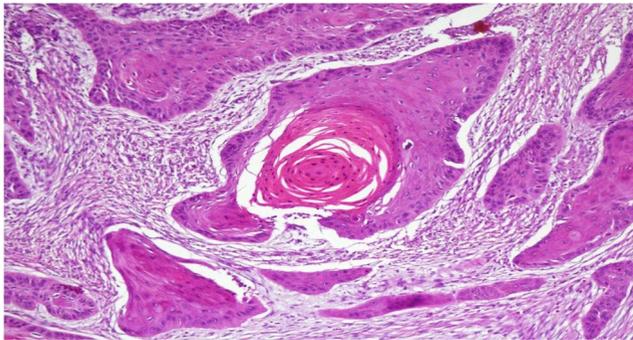
Intra-operatively, left ovary was replaced by a cyst measuring 8cmX6.5cm in diameter. The cyst had smooth surface, no papillary excrescences, had undergone torsion by one and a half turns and was adherent to the sigmoid colon. Peritoneal fluid for cytology was taken. There were no other deposits in the abdominal and pelvic cavity.

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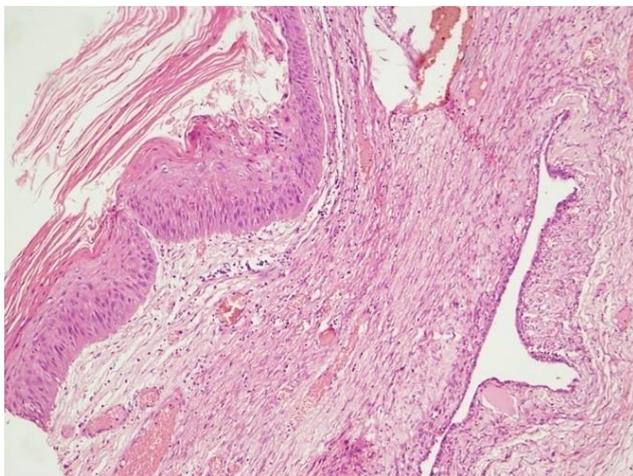
While separating the cyst, it got accidentally ruptured making the stage to be IC1 (surgical spill). The cyst was filled with hair and pultaceous material and a focal solid area measuring 3cm in maximum diameter was identified, but frozen section could not be arranged due to technical reasons. Total abdominal hysterectomy with bilateral salpingo oophorectomy was done and multiple omental biopsies were taken.

Report showed peritoneal fluid to be free of malignant cells. Histopathology confirmed stratified squamous epithelium lining the cyst wall showing full thickness dysplasia and keratinous material in the lumen. (Figure 1 & 2)



**Fig. 1:** Showing keratin pearl

Biopsy from the solid area showed presence of an invasive tumour with moderately anaplastic squamous cells arranged in islands, nests, sheets, and evidence of intracellular keratinisation. Intervening stroma showed moderate lympho-mono-nuclear cell infiltrate.



**Fig. 2:** Showing squamous cell carcinoma

Post-operative CECT(contrast enhanced computerized tomography) abdomen showed 1.8X1.2cm left paraaortic lymph node, rest was normal. PET scan (positron emission tomography) at a higher centre showed paraaortic

lymph node enhancement and FNAC(fine needle aspiration cytology) from this lymph node showed squamous cell carcinoma. Patient refused second laparotomy for performing omentectomy and underwent 6 cycles of chemotherapy with carboplatin and paclitaxel at three weekly intervals, but within two months post chemotherapy completion she developed ascites, pleural effusion and succumbed within nine months of surgery.

### 3. Discussion

MCT is the commonest ovarian tumour in females of reproductive age and accounts for 10-25% of all ovarian neoplasms.<sup>1</sup> Malignancy has been found in association with MCT in 0.5- 2% of cases.<sup>2</sup> However, in a retrospective study conducted by Bal A et al. the incidence of MT in MCT was much higher, being 6.67%.<sup>6</sup>

Squamous cell carcinoma (SCC) of the ovary is usually found in postmenopausal women with a mean age of 55.2 years as compared to 37.5 years in benign dermoid tumour.<sup>7</sup> Our patient was a 57 years old post-menopausal woman. Mostly patients present with lower abdominal pain as in our patient, abdominal mass, or abdominal distension<sup>7</sup> but can also present with features suggestive of torsion as occurred later in our patient.<sup>8</sup>

Mean tumour size of MCT is 64mm and of MT is 92-152mm<sup>7</sup> being like our ultrasound and histopathology report which may have macroscopically been undersized because of rupture and extrusion of material.

Due to the rarity of malignant transformation, pre-operative diagnosis of SCC in MCT is difficult to make.<sup>9</sup> The RMI (risk of malignancy index) based on CA125 value, menopausal status and ultrasound parameters helps categorize patients with ovarian mass into low, intermediate and high risk groups for malignancy with a sensitivity of 85.4% and specificity of 96.9%.<sup>10</sup>

RMI index is CA125 value× ultrasound findings× menopausal status. On ultrasound, presence of any one feature out of the following is given a score of 1- multilocular cyst, solid areas, bilateral lesions, ascites, intraabdominal metastases whereas presence of two or more features is given a score of 3. Premenopausal status is given a score of 1 and postmenopausal a score of 3.<sup>11</sup>

RMI score greater than 250 is associated with a high risk of malignancy and these patients need referral to a gynecologist oncologist. Patients with RMI score 25-200 have intermediate risk of malignancy and can be managed by a general gynecologist. RMI score less than 25 has a low risk of malignancy.<sup>11</sup>

In a typically suspected case of dermoid cyst on USG without any suspicion of malignancy, CA-125 may not be ordered routinely and hence RMI index is not always calculated. Our patient was also a clinically suspected case of dermoid cyst preoperatively and intraoperatively with no suspicion of malignancy but if RMI score would have been

calculated which came out to be 96 (CA125×U×M, that is, 32×1×3), she would lie in the intermediate risk group and need to be investigated further for malignancy.

Malignant transformation should be suspected in mature cystic teratoma if these criteria are met - age>50 years, tumours >10 cm, high levels of cancer antigen CA125 and squamous-cell-carcinoma antigen.<sup>12</sup>

CA-125 levels are also measured before chemotherapy or for follow up post treatment upto five years.<sup>13</sup>

Significance of tumor markers like Serum cancer antigen 125 (CA125), Serum SCC antigen when more than 1.5 ng/ml, Serum carbohydrate antigen 19-9 (CA19-9) and Carcinoembryonic antigen (CEA) levels have been comprehended for positivity and adverse outcomes.<sup>14</sup>

Colour Doppler sonography also helps to differentiate between the malignant and benign ovarian masses. Fleischer et al showed the positive and negative predictive value of colour Doppler sonography as 98% & 83% respectively.<sup>15</sup> Presence of torsion and metabolic activity in benign masses may give false results.

On MRI, MCT reveals high signal intensities and presence of fat fluid levels, whereas on the other hand MT shows solid or necrotic contrast enhancing areas which may extend transmurally. Also in MT, ovarian tumour is adherent to the surrounding structures. Radiological features of malignancy consist of solid component, soft tissue protuberance (rokitansky protuberance or dermoid nipple), capsular penetration or direct invasion of adjacent structures (reflecting supervening SCC).

Fat-suppression techniques in magnetic resonance imaging arising from fat present in the dermoid cyst have also been suggested to help in preoperatively suspecting MT.<sup>16</sup>

Suspecting malignancy preoperatively helps in deciding the mode of surgery between laparotomy vs laparoscopic removal. Open surgery is believed to decrease the chances of spillage and peritoneal dissemination and hence prevent subsequent up staging of tumour. Laparoscopic removal of adherent MCTs frequently causes spillage. Intraoperative spillage of the tumour contents is also significant as it leads to expeditious postoperative progression.<sup>17</sup>

In his series Black et al. highlighted 100% detection of malignant components within MCTs in frozen sections of tissue samples containing malignancy. This is significant as detection of malignancy on frozen section helps prevent a second laparotomy.<sup>18</sup>

Another study attempted to co-relate HPV(human papilloma virus) infection with malignant transformation in MCT of the ovary as HPV is implicated as a causative factor in squamous cell carcinoma of the cervix. By demonstrating HPV capsid and HPV16/18 E6 proteins in the SCC-MCT tissue, cervix, and adjacent reproductive organ tissues including pelvic and para-aortic lymph nodes in 95% cases, the possibility of ascending route of infection of viral particles from the cervix, endometrium, fallopian tubes and

then to the ovaries has been suggested, thereby establishing a causal factor relationship between HPV and squamous cell carcinoma in ovarian MCT.<sup>19</sup>

Prognosis of MCT depends on factors like stage of tumour, tumour metastasis, cyst wall invasion, ascites, spontaneous or accidental rupture, adhesions, type of malignant transformation other than squamous cell carcinoma and is usually poor in advanced stages.

Treatment is multimodal therapy including surgery followed by chemotherapy or radiotherapy. Chemotherapy is usually cisplatin-based combination (BEP) therapy. The benefits of radiotherapy and chemotherapy remain doubtful. However, it can be considered in women at high risk of relapse postoperatively.<sup>3</sup> Compared to primary epithelial ovarian tumours, chemotherapy is less effective in MCT.<sup>1</sup> Many studies have advocated simultaneous chemoradiation as is used for cervical squamous cell carcinomas, with varying results.<sup>1,8</sup>

A second debulking surgery is suggested where long lasting remissions are followed by recurrence. It is usually performed if there is a single site relapse which is completely resectable.

#### 4. Conclusion

Malignant transformation in mature cystic teratoma is a rare entity. But it is associated with poor prognosis. In advanced stages or large sized ovarian masses complete preoperative workup with all tumour markers and imaging techniques should be availed to substantiate suspicion. Open surgery should be preferred with prior intimation for frozen section and consent for complete staging laparotomy. Post-operative follow up and treatment depending on stage should be offered as per institute policy. In view of its rarity, consensus on ideal treatment is lacking.

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#### 6. Conflict of Interest

The author declares no conflict of interest.

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